



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 2  
DESA/HWSB/HWSS  
2890 Woodbridge Avenue, Edison, NJ 08837

## EXECUTIVE NARRATIVE

**Case No.:** 47747

**Site:** Pierson's Creek

**Number of Samples:** 3 (Soil)

**Analysis:** Metals (ICP-AES) and Hg (MA# 2755.2)

**SDG No.:** MBE7Z4

**Laboratory:** Chemtech Consulting Group

**Sampling dates:** 12/4/2018

**Validation SOP:** HW-3a, and -3c (Rev 1)

### **QAPP**

**Contractor:** CDM Smith

**Reference:** DCN:3323-077-03593, July 30, 2018

### **SUMMARY OF DEFINITIONS:**

**Critical:** Results have an unacceptable level of uncertainty and should not be used for making decisions.  
Data have been qualified "R" rejected.

**Major:** A level of uncertainty exists that may not meet the data quality objectives for the project. A bias is likely to be present in the results. Data has been qualified "J" estimated. "J+" and "J-" represent likely direction of the bias.

**Minor:** The level of uncertainty is acceptable. No significant bias in the data was observed.

#### **Critical Findings:**

None

#### **Major Findings:**

Sample MBE7Z4 has analytes that have been qualified J, J+ or J-.

#### **Minor Findings:**

One or more analytes in one or more samples are qualified "J" due to results between MDL and CRQL.

**COMMENT:** The site specific QAPP did not provide the project action levels for samples from this site.

**Reviewer Name(s):** Jianwei Huang

**Approver's Signature:**

**Date:** 02/13/2019

**Name:** Narendra Kumar

**Affiliation:** USEPA/R2/HWSB/HWSS



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Data Qualifier Definitions (National Functional Guidelines)			
Qualifier Symbol	Explanation		
	INORGANICS	ORGANICS	CHLORINATED DIOXIN/FURAN
U	The analyte was analyzed for, but was not detected above the level of the reported quantitation limit.	The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the adjusted Contract Required Quantitation Limit (CRQL) for sample and method	The analyte was analyzed for but not detected. The value preceding the "U" may represent the adjusted Contract Required Quantitation Limit (see DLM02.X, Exhibit D, Section 1.2 and Table 2), or the sample specific estimated detection limit (EDL, see Method 8290A, Section 11.9.5).
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.	The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the CRQL).	The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (due either to an issue with the quality of the data generated because certain QC criteria were not met, or the concentration of the analyte was below the adjusted CRQL).
J+	The result is an estimated quantity, but the result may be biased high.	The result is an estimated quantity, but the result may be biased high.	
J-	The result is an estimated quantity, but the result may be biased low.	The result is an estimated quantity, but the result may be biased low.	
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.	The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.	The analyte was not detected (see definition of "U" flag, above). The reported value should be considered approximate.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.	The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.	The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
N		The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".	
NJ		The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.	
C		This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).	
X		This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful.	



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## DATA ASSESSMENT

### ANALYSIS: METALS ICP-AES

The current SOP HW-3a (Rev 1) September 2016, USEPA Region II for the evaluation of ICP-AES metals generated through Statement of Work ISOM02.2, and any future editorial revisions of ISOM02.2 has been applied. Data have been reviewed according to TDF specifications, the National Functional Guidelines Report and the CCS Semi- Automated Screening Results Report.

#### 1. HOLDING TIME AND PRESERVATION

The amount of an analyte in a sample can change with time due to chemical instability, degradation, volatilization, etc. If the specified holding time or pH (aqueous samples are not within the acceptable range, the data may not be valid. Those analytes detected in the samples whose holding time (180 days) or pH (<2) have not been met, will be qualified as estimated, "J"; the non-detects will be flagged as unusable, "R". Qualifications were applied to the samples and analytes as shown below.

No problems were found for this criterion.

#### 2. CALIBRATION

Method requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable quantitative data for the metals on the Inorganic Target Analyte List (TAL). Initial Calibration Verification (ICV) demonstrates that the instrument is capable of acceptable performance at the beginning of the analytical run. Continuing Calibration Verification (CCV) demonstrates that the initial calibration is still valid by checking the performance of the instrument on a continuing basis.

##### A) INITIAL CALIBRATION

A blank and at least five calibration standards shall be used to establish each analytical curve. At least one of these standards shall be at or below the CRQL. The calibration curve shall be fitted using linear regression or weighted linear regression. The curve may be forced through zero. The curve must have a correlation coefficient  $\geq 0.995$ . The percent differences calculated for all of the non-zero standards must be within  $\pm 30\%$  of the true value of the standard. The y-intercept of the curve must be less than the CRQL. Qualifications were applied to the samples and analytes as shown below.

No problems were found for this criterion.

##### B) INITIAL AND CONTINUING CALIBRATION VERIFICATION

Immediately after each system has been calibrated, the accuracy of the initial calibration must be verified and documented for each target analyte by the analysis of an ICV solution(s). The CCV standard shall be analyzed at a frequency of every two hours during an analytical run. The CCV standard shall also be analyzed at the beginning of the run, and again after the last analytical sample. The percent recovery acceptable limits for ICV/CCV are 90 – 110%. Qualifications were applied to the samples and analytes as shown below.

No problems were found for this criterion.

#### 3. BLANK CONTAMINATION



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Quality assurance (QA) blanks, i.e., method, field, or rinse blanks are prepared to identify any contamination, which may have been introduced into the samples during sample preparation or field activity. Calibration blanks (ICB and CCB) are used to ensure a stable instrument baseline before and during the analysis of analytical samples. The preparation blank is used to assess the level of contamination introduced to the analytical samples throughout the sample preparation process. Field and rinse blanks measure cross-contamination of samples during field operations. Qualifications were applied to the samples and analytes as shown below.

The following sample has analyte results less than or equal to CRQLs. The associated CCB analyte results are less than or equal to CRQLs. Detects are qualified as U. Sample results are reported at CRQLs.

**Silver MBE8B6**

#### 4. INTERFERENCE CHECK SAMPLE

The Interference Check Sample (ICS) verifies the analytical instrument's ability to overcome interferences typical of those found in samples. The laboratory should have analyzed and reported ICS results for all elements being reported from the analytical run and for all interferents (target and non-target) for these reported elements. The ICS consists of two solutions: Solution A and Solution AB. Solution A consists of the interferents, and Solution AB consists of the analytes mixed with the interferents. Results for the analysis of ICS Solution must fall within the control limits of  $\pm 20\%$  or  $\pm CRQL$  (whichever is greater) of the true value for the analytes and interferents included in the solution. If results that are  $\geq MDL$  are observed for analytes that are not present in the ICS solution, the possibility of false positives exists. If negative results are observed for analytes that are not present in the ICS solution, and their absolute value is  $\geq MDL$ , the possibility of false negatives in the samples exists. In general, ICP sample data can be accepted if the concentrations of Al, Ca, Fe, and Mg in the sample are found to be less than or equal to their respective concentrations in the ICS. Qualifications were applied to the samples and analytes as shown below.

No problems were found for this criterion.

#### 5. SPIKE SAMPLE ANALYSIS

The spiked sample analysis is designed to provide information about the effect of each sample matrix on the sample preparation procedures and the measurement methodology. The spike Percent Recovery (%R) shall be within the established acceptance limits of 75 – 125%. However, spike recovery limits do not apply when the sample concentration is  $\geq 4x$  the spike added. For a matrix spike analysis that does not meet the technical criteria, the action was applied to only the field sample used to prepare the matrix spike sample.

The following sample is associated with Matrix Spike sample that has spike analyte %R within 30 - 74% and Post-digestion spike analyte %R less than 75%. Detects are qualified as J-. Non-detects are qualified as UJ.

**Selenium MBE7Z4**

The following Matrix Spike sample has percent recoveries in the range of 30-74% and there is no post-digestion spike sample performed. Detected analytes are qualified J-. Non-detected analytes are qualified UJ.

**Silver MBE7Z4**



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## 6. DUPLICATE SAMPLE ANALYSIS

The objective of duplicate sample analysis is to demonstrate acceptable method precision by the laboratory at the time of analysis. A control limit of 35% for the Relative Percent Difference (RPD) shall be used for original and duplicate sample values  $\geq$  five times (5x) the Contract Required Quantitation Limit (CRQL). A control limit of the CRQL shall be used if either the sample or duplicate value is  $< 5x$  the CRQL. For a duplicate sample analysis that does not meet the technical criteria, the action was applied to only the field sample used to prepare the duplicate sample.

No problems were found for this criterion.

## 7. FIELD DUPLICATE

Field duplicates may be taken and analyzed as an indication of overall precision. These analyses measure both field and laboratory precision. A control limit of 50% for the Relative Percent Difference (RPD) shall be used for original and duplicate sample values  $\geq$  five times (5x) the Contract Required Quantitation Limit (CRQL). A control limit of 2x the CRQL shall be used if either the sample or duplicate value is  $< 5x$  the CRQL. For field duplicates analysis that does not meet the technical criteria, the action was applied to only the field sample and it's duplicate.

No field duplicate sample was identified in this SDG.

## 8. LABORATORY CONTROL SAMPLE

The Laboratory Control Sample (LCS) serves as a monitor of the overall performance of each step during the analysis, including the sample preparation. Aqueous/water, soil/sediment, wipe, and filter LCSs shall be analyzed for each analyte utilizing the same sample preparations, analytical methods, and Quality Assurance/Quality Control (QA/QC) procedures as employed for the samples. All LCS Percent Recoveries (%R) must fall within the control limits of 70-130%, except for Sb and Ag which must fall within the control limits of 50-150%. Qualifications were applied to the samples and analytes as shown below.

No problems were found for this criterion.

## 9. ICP SERIAL DILUTION

The serial dilution of samples quantitated by Inductively Coupled Plasma determines whether or not significant physical or chemical interferences exist due to sample matrix. If the analyte concentration is sufficiently high [concentration in the original sample is  $>$  50 times (50x) the Method Detection Limit (MDL)], the Percent Difference (%D) between the original determination and the serial dilution analysis (a five-fold dilution) after correction for dilution shall be less than 15. For a serial dilution analysis that does not meet the technical criteria, the action was applied to only the field sample used to prepare the serial dilution sample.

No problems were found for this criterion.

## 10. PERCENT SOLIDS

The laboratory is required to perform the percent solids determination prior to sample preparation and analysis. All results of a sample with percent solids less than 50% are qualified estimated, "J". Qualifications were applied to the samples and analytes as shown below.



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No problems were found for this criterion.

### **ANALYSIS: MERCURY (MA# 2755.2)**

The current SOP HW-3c (Rev 1) September 2016, USEPA Region II for the evaluation of Mercury generated through Statement of Work ISOM02.2, and any future editorial revisions of ISOM02.2 has been applied. Data have been reviewed according to TDF specifications, the National Functional Guidelines Report and the CCS Semi- Automated Screening Results Report.

#### **1. HOLDING TIME AND PRESERVATION**

The amount of an analyte in a sample can change with time due to chemical instability, degradation, volatilization, etc. If the specified holding time, pH (aqueous samples), or cooler temperature are not within the acceptable range, the data may not be valid. Those analytes detected in the samples whose holding time (28 days) and pH (<2) have not been met, will be qualified as estimated, "J"; the non-detects (sample quantitation limits) will be flagged as unusable, "R". Qualifications were applied to the samples and analytes as shown below.

No problems were found for this criterion.

#### **2. CALIBRATION**

Method requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable quantitative data for mercury. Initial Calibration Verification (ICV) demonstrates that the instrument is capable of acceptable performance at the beginning of the analytical run. Continuing Calibration Verification (CCV) demonstrates that the initial calibration is still valid by checking the performance of the instrument on a continuing basis.

##### **A) INITIAL CALIBRATION**

A blank and at least five calibration standards shall be employed to establish the analytical curve. At least one of the calibration standards shall be at or below the Contract Required Quantitation Limit (CRQL). The calibration curve shall be fitted using linear regression or weighted linear regression. The curve may be forced through zero. The calibration curves for mercury shall possess a correlation coefficient of  $\geq 0.995$  to ensure the linearity over the calibrated range. The percent differences calculated for all of the non-zero standards must fall within  $\pm 30\%$  of the true value of the standard. The y-intercept of the curve must be less than the CRQL. All sample results shall be reported from an analysis within the calibrated range. Qualifications were applied to the samples and analytes as shown below.

No problems were found for this criterion.

##### **B) INITIAL AND CONTINUING CALIBRATION VERIFICATION**

Immediately after each system has been calibrated, the accuracy of the initial calibration must be verified and documented for mercury by the analysis of an ICV solution(s). The CCV standard shall be analyzed at a frequency of every hour during an analytical run. The CCV standard shall also be analyzed at the beginning of the run, and again after the last analytical sample. The percent recovery acceptable limits for ICV/CCV are 85 – 115%. Qualifications were applied to the samples and analytes as shown below.



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No problems were found for this criterion.

### 3. BLANK CONTAMINATION

**Quality assurance (QA) blanks, i.e., method, field, or rinse blanks are prepared to identify any contamination, which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Field and rinse blanks measure cross-contamination of samples during field operations. Qualifications were applied to the samples and analytes as shown below.**

No problems were found for this criterion.

### 4. SPIKE SAMPLE ANALYSIS

**The spiked sample analysis is designed to provide information about the effect of each sample matrix on the sample preparation procedures and the measurement methodology. The spike Percent Recovery (%R) shall be within the established acceptance limits of 75 – 125%. However, spike recovery limits do not apply when the sample concentration is  $\geq 4x$  the spike added. For a matrix spike analysis that does not meet the technical criteria, the action was applied to only the field sample used to prepare the matrix spike sample.**

The following sample is associated with Matrix Spike sample that has spike analyte %R within 30 - 74%. Detects are qualified as J-. Non-detects are qualified as UJ.

Mercury            MBE7Z4

### 5. DUPLICATE SAMPLE ANALYSIS

**The objective of duplicate sample analysis is to demonstrate acceptable method precision by the laboratory at the time of analysis. A control limit of 35% for the Relative Percent Difference (RPD) shall be used for original and duplicate sample values  $\geq$  five times (5x) the Contract Required Quantitation Limit (CRQL). A control limit of the CRQL shall be used if either the sample or duplicate value is  $< 5x$  the CRQL. For a duplicate sample analysis that does not meet the technical criteria, the action was applied to only the field sample used to prepare the duplicate sample.**

No problems were found for this criterion.

### 6. FIELD DUPLICATE

**Field duplicates may be taken and analyzed as an indication of overall precision. These analyses measure both field and laboratory precision. A control limit of 20% for the Relative Percent Difference (RPD) shall be used for original and duplicate sample values  $\geq$  five times (5x) the Contract Required Quantitation Limit (CRQL). A control limit of the CRQL shall be used if either the sample or duplicate value is  $< 5x$  the CRQL. For field duplicates analysis that does not meet the technical criteria, the action was applied to only the field sample and it's duplicate.**

No field duplicate sample was identified in this SDG.

### 7. PERCENT SOLIDS



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**The laboratory is required to perform the percent solids determination prior to sample preparation and analysis. Qualifications were applied to the samples and analytes as shown below.**

No problems were found for this criterion.

# Sample Summary Report

Project Name: PIERSON'S CREEK Project

GroupID: 47747/EPW14030/MBE7Z4

Lab Name: Chemtech Consulting Group

Sample Number: LCS606	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location:	pH:	Sample Date:	Sample Time:
% Moisture:		% Solids: 100	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Aluminum	Spike	40.0		mg/kg	40.0		1.0	YES	S3VEM
Antimony	Spike	11.9		mg/kg	11.9		1.0	YES	S3VEM
Arsenic	Spike	2.2		mg/kg	2.2		1.0	YES	S3VEM
Barium	Spike	39.5		mg/kg	39.5		1.0	YES	S3VEM
Beryllium	Spike	1.0		mg/kg	1.0		1.0	YES	S3VEM
Cadmium	Spike	1.0		mg/kg	1.0		1.0	YES	S3VEM
Calcium	Spike	988		mg/kg	988		1.0	YES	S3VEM
Chromium	Spike	2.3		mg/kg	2.3		1.0	YES	S3VEM
Cobalt	Spike	9.6		mg/kg	9.6		1.0	YES	S3VEM
Copper	Spike	5.4		mg/kg	5.4		1.0	YES	S3VEM
Iron	Spike	20.9		mg/kg	20.9		1.0	YES	S3VEM
Lead	Spike	1.8		mg/kg	1.8		1.0	YES	S3VEM
Magnesium	Spike	972		mg/kg	972		1.0	YES	S3VEM
Manganese	Spike	3.0		mg/kg	3.0		1.0	YES	S3VEM
Nickel	Spike	8.1		mg/kg	8.1		1.0	YES	S3VEM
Potassium	Spike	890		mg/kg	890		1.0	YES	S3VEM
Selenium	Spike	7.3		mg/kg	7.3		1.0	YES	S3VEM
Silver	Spike	2.0		mg/kg	2.0		1.0	YES	S3VEM
Sodium	Spike	980		mg/kg	980		1.0	YES	S3VEM
Thallium	Spike	5.2		mg/kg	5.2		1.0	YES	S3VEM
Vanadium	Spike	9.9		mg/kg	9.9		1.0	YES	S3VEM
Zinc	Spike	11.0		mg/kg	11.0		1.0	YES	S3VEM

# Sample Summary Report

Project Name: PIERSON'S CREEK Project

GroupID: 47747/EPW14030/MBE7Z4

Lab Name: Chemtech Consulting Group

Sample Number: MBE7Z4	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number: 2755.2
Sample Location: Supplemental Surface Soil	pH:	Sample Date: 12/04/2018	Sample Time: 13:42:00
% Moisture:		% Solids: 91.2	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	5.4	J-	mg/kg	5.4	D	5.0	YES	S3VEM

# Sample Summary Report

Project Name: PIERSON'S CREEK Project

GroupID: 47747/EPW14030/MBE7Z4

Lab Name: Chemtech Consulting Group

Sample Number: MBE7Z4	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Supplemental Surface Soi	pH:	Sample Date: 12/04/2018	Sample Time: 13:42:00
% Moisture:		% Solids: 91.2	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Aluminum	Target	5390		mg/kg	5390		1.0	YES	S3VEM
Antimony	Target	0.92	J	mg/kg	0.92	J	1.0	YES	S3VEM
Arsenic	Target	13.0		mg/kg	13.0		1.0	YES	S3VEM
Barium	Target	90.1		mg/kg	90.1		1.0	YES	S3VEM
Beryllium	Target	0.42		mg/kg	0.42		1.0	YES	S3VEM
Cadmium	Target	0.59		mg/kg	0.59		1.0	YES	S3VEM
Calcium	Target	7300		mg/kg	7300		1.0	YES	S3VEM
Chromium	Target	18.6		mg/kg	18.6		1.0	YES	S3VEM
Cobalt	Target	9.9		mg/kg	9.9		1.0	YES	S3VEM
Copper	Target	54.9		mg/kg	54.9		1.0	YES	S3VEM
Iron	Target	24100		mg/kg	24100		1.0	YES	S3VEM
Lead	Target	228		mg/kg	228		1.0	YES	S3VEM
Magnesium	Target	2770		mg/kg	2770		1.0	YES	S3VEM
Manganese	Target	265		mg/kg	265		1.0	YES	S3VEM
Nickel	Target	14.6		mg/kg	14.6		1.0	YES	S3VEM
Potassium	Target	448		mg/kg	448		1.0	YES	S3VEM
Selenium	Target	2.8	UJ	mg/kg	2.8	U*	1.0	YES	S3VEM
Silver	Target	0.80	UJ	mg/kg	0.80	U*	1.0	YES	S3VEM
Sodium	Target	1350		mg/kg	1350		1.0	YES	S3VEM
Thallium	Target	0.89	J	mg/kg	0.89	J	1.0	YES	S3VEM
Vanadium	Target	34.2		mg/kg	34.2		1.0	YES	S3VEM
Zinc	Target	190		mg/kg	190		1.0	YES	S3VEM

# Sample Summary Report

Project Name: PIERSON'S CREEK Project

GroupID: 47747/EPW14030/MBE7Z4

Lab Name: Chemtech Consulting Group

Sample Number: MBE7Z4A

Method: Metals by ICP-AES

Matrix: Soil

MA Number:

Sample Location:

pH:

Sample Date: 12/04/2018

Sample Time: 13:42:00

% Moisture:

% Solids: 91.2

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Selenium	Spike	3.7		mg/kg	3.7		1.0	YES	S3VEM

# Sample Summary Report

Project Name: PIERSON'S CREEK Project

GroupID: 47747/EPW14030/MBE7Z4

Lab Name: Chemtech Consulting Group

Sample Number: MBE7Z4D

Method: Mercury by Cold Vapor

Matrix: Soil

MA Number: 2755.2

Sample Location:

pH:

Sample Date: 12/04/2018

Sample Time: 13:42:00

% Moisture:

% Solids: 91.2

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	5.3		mg/kg	5.3	D	5.0	YES	S3VEM

# Sample Summary Report

Project Name: PIERSON'S CREEK Project

GroupID: 47747/EPW14030/MBE7Z4

Lab Name: Chemtech Consulting Group

Sample Number: MBE7Z4D	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location:	pH:	Sample Date: 12/04/2018	Sample Time: 13:42:00
% Moisture:		% Solids: 91.2	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Aluminum	Target	5450		mg/kg	5450		1.0	YES	S3VEM
Antimony	Target	0.86	J	mg/kg	0.86	J	1.0	YES	S3VEM
Arsenic	Target	13.1		mg/kg	13.1		1.0	YES	S3VEM
Barium	Target	91.1		mg/kg	91.1		1.0	YES	S3VEM
Beryllium	Target	0.43		mg/kg	0.43		1.0	YES	S3VEM
Cadmium	Target	0.60		mg/kg	0.60		1.0	YES	S3VEM
Calcium	Target	7300		mg/kg	7300		1.0	YES	S3VEM
Chromium	Target	19.0		mg/kg	19.0		1.0	YES	S3VEM
Cobalt	Target	10.0		mg/kg	10.0		1.0	YES	S3VEM
Copper	Target	55.0		mg/kg	55.0		1.0	YES	S3VEM
Iron	Target	24400		mg/kg	24400		1.0	YES	S3VEM
Lead	Target	230		mg/kg	230		1.0	YES	S3VEM
Magnesium	Target	2830		mg/kg	2830		1.0	YES	S3VEM
Manganese	Target	269		mg/kg	269		1.0	YES	S3VEM
Nickel	Target	14.7		mg/kg	14.7		1.0	YES	S3VEM
Potassium	Target	454		mg/kg	454		1.0	YES	S3VEM
Selenium	Target	2.8	U	mg/kg	2.8	U	1.0	YES	S3VEM
Silver	Target	0.79	U	mg/kg	0.79	U	1.0	YES	S3VEM
Sodium	Target	1380		mg/kg	1380		1.0	YES	S3VEM
Thallium	Target	1.3	J	mg/kg	1.3	J	1.0	YES	S3VEM
Vanadium	Target	34.9		mg/kg	34.9		1.0	YES	S3VEM
Zinc	Target	190		mg/kg	190		1.0	YES	S3VEM

# Sample Summary Report

Project Name: PIERSON'S CREEK Project

GroupID: 47747/EPW14030/MBE7Z4

Lab Name: Chemtech Consulting Group

Sample Number: MBE7Z4L	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location:	pH:	Sample Date:	Sample Time:
% Moisture:		% Solids: 91.2	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Aluminum	Target	5600		mg/kg	5600		5.0	YES	S3VEM
Antimony	Target	24.0	U	mg/kg	24.0	U	5.0	YES	S3VEM
Arsenic	Target	13.3		mg/kg	13.3		5.0	YES	S3VEM
Barium	Target	93.8		mg/kg	93.8		5.0	YES	S3VEM
Beryllium	Target	0.46	J	mg/kg	0.46	J	5.0	YES	S3VEM
Cadmium	Target	0.44	J	mg/kg	0.44	J	5.0	YES	S3VEM
Calcium	Target	7670		mg/kg	7670		5.0	YES	S3VEM
Chromium	Target	19.8		mg/kg	19.8		5.0	YES	S3VEM
Cobalt	Target	9.3	J	mg/kg	9.3	J	5.0	YES	S3VEM
Copper	Target	57.4		mg/kg	57.4		5.0	YES	S3VEM
Iron	Target	25600		mg/kg	25600		5.0	YES	S3VEM
Lead	Target	219		mg/kg	219		5.0	YES	S3VEM
Magnesium	Target	2950		mg/kg	2950		5.0	YES	S3VEM
Manganese	Target	280		mg/kg	280		5.0	YES	S3VEM
Nickel	Target	13.7	J	mg/kg	13.7	J	5.0	YES	S3VEM
Potassium	Target	473	J	mg/kg	473	J	5.0	YES	S3VEM
Selenium	Target	14.0	U	mg/kg	14.0	U	5.0	YES	S3VEM
Silver	Target	4.0	U	mg/kg	4.0	U	5.0	YES	S3VEM
Sodium	Target	1460	J	mg/kg	1460	J	5.0	YES	S3VEM
Thallium	Target	10.0	U	mg/kg	10.0	U	5.0	YES	S3VEM
Vanadium	Target	35.4		mg/kg	35.4		5.0	YES	S3VEM
Zinc	Target	197		mg/kg	197		5.0	YES	S3VEM

# Sample Summary Report

Project Name: PIERSON'S CREEK Project

GroupID: 47747/EPW14030/MBE7Z4

Lab Name: Chemtech Consulting Group

Sample Number: MBE7Z4S

Method: Mercury by Cold Vapor

Matrix: Soil

MA Number: 2755.2

Sample Location:

pH:

Sample Date: 12/04/2018

Sample Time: 13:42:00

% Moisture:

% Solids: 91.2

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Spike	5.7		mg/kg	5.7	D	5.0	YES	S3VEM

# Sample Summary Report

Project Name: PIERSON'S CREEK Project

GroupID: 47747/EPW14030/MBE7Z4

Lab Name: Chemtech Consulting Group

Sample Number: MBE7Z4S	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location:	pH:	Sample Date: 12/04/2018	Sample Time: 13:42:00
% Moisture:		% Solids: 91.2	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Spike	16.4		mg/kg	16.4		1.0	YES	S3VEM
Arsenic	Spike	18.5		mg/kg	18.5		1.0	YES	S3VEM
Barium	Spike	423		mg/kg	423		1.0	YES	S3VEM
Beryllium	Spike	8.2		mg/kg	8.2		1.0	YES	S3VEM
Cadmium	Spike	9.4		mg/kg	9.4		1.0	YES	S3VEM
Chromium	Spike	52.7		mg/kg	52.7		1.0	YES	S3VEM
Cobalt	Spike	98.9		mg/kg	98.9		1.0	YES	S3VEM
Copper	Spike	95.8		mg/kg	95.8		1.0	YES	S3VEM
Lead	Spike	225		mg/kg	225		1.0	YES	S3VEM
Manganese	Spike	345		mg/kg	345		1.0	YES	S3VEM
Nickel	Spike	104		mg/kg	104		1.0	YES	S3VEM
Selenium	Spike	4.7		mg/kg	4.7	*	1.0	YES	S3VEM
Silver	Spike	5.9		mg/kg	5.9	*	1.0	YES	S3VEM
Thallium	Spike	10.6		mg/kg	10.6		1.0	YES	S3VEM
Vanadium	Spike	118		mg/kg	118		1.0	YES	S3VEM
Zinc	Spike	260		mg/kg	260		1.0	YES	S3VEM

# Sample Summary Report

Project Name: PIERSON'S CREEK Project

GroupID: 47747/EPW14030/MBE7Z4

Lab Name: Chemtech Consulting Group

Sample Number: MBE8B5	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number: 2755.2
Sample Location: Supplemental Surface Soil	pH:	Sample Date: 12/04/2018	Sample Time: 10:12:00
% Moisture:		% Solids: 82.7	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	138		mg/kg	138	D	100.0	YES	S3VEM

# Sample Summary Report

Project Name: PIERSON'S CREEK Project

GroupID: 47747/EPW14030/MBE7Z4

Lab Name: Chemtech Consulting Group

Sample Number: MBE8B5	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Supplemental Surface Soi	pH:	Sample Date: 12/04/2018	Sample Time: 10:12:00
% Moisture:		% Solids: 82.7	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Aluminum	Target	6270		mg/kg	6270		1.0	YES	S3VEM
Antimony	Target	1.6	J	mg/kg	1.6	J	1.0	YES	S3VEM
Arsenic	Target	11.5		mg/kg	11.5		1.0	YES	S3VEM
Barium	Target	142		mg/kg	142		1.0	YES	S3VEM
Beryllium	Target	0.52		mg/kg	0.52		1.0	YES	S3VEM
Cadmium	Target	1.9		mg/kg	1.9		1.0	YES	S3VEM
Calcium	Target	12300		mg/kg	12300		1.0	YES	S3VEM
Chromium	Target	29.0		mg/kg	29.0		1.0	YES	S3VEM
Cobalt	Target	24.2		mg/kg	24.2		1.0	YES	S3VEM
Copper	Target	121		mg/kg	121		1.0	YES	S3VEM
Iron	Target	25400		mg/kg	25400		1.0	YES	S3VEM
Lead	Target	805		mg/kg	805		1.0	YES	S3VEM
Magnesium	Target	2050		mg/kg	2050		1.0	YES	S3VEM
Manganese	Target	300		mg/kg	300		1.0	YES	S3VEM
Nickel	Target	32.5		mg/kg	32.5		1.0	YES	S3VEM
Potassium	Target	653		mg/kg	653		1.0	YES	S3VEM
Selenium	Target	3.0	U	mg/kg	3.0	U*	1.0	YES	S3VEM
Silver	Target	1.8		mg/kg	1.8	*	1.0	YES	S3VEM
Sodium	Target	833		mg/kg	833		1.0	YES	S3VEM
Thallium	Target	1.2	J	mg/kg	1.2	J	1.0	YES	S3VEM
Vanadium	Target	26.8		mg/kg	26.8		1.0	YES	S3VEM
Zinc	Target	305		mg/kg	305		1.0	YES	S3VEM

# Sample Summary Report

Project Name: PIERSON'S CREEK Project

GroupID: 47747/EPW14030/MBE7Z4

Lab Name: Chemtech Consulting Group

Sample Number: MBE8B6	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number: 2755.2
Sample Location: Supplemental Surface Soil	pH:	Sample Date: 12/04/2018	Sample Time: 10:55:00
% Moisture:		% Solids: 84.6	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	101		mg/kg	101	D	100.0	YES	S3VEM

# Sample Summary Report

Project Name: PIERSON'S CREEK Project

GroupID: 47747/EPW14030/MBE7Z4

Lab Name: Chemtech Consulting Group

Sample Number: MBE8B6	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Supplemental Surface Soi	pH:	Sample Date: 12/04/2018	Sample Time: 10:55:00
% Moisture:		% Solids: 84.6	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Aluminum	Target	6150		mg/kg	6150		1.0	YES	S3VEM
Antimony	Target	0.73	J	mg/kg	0.73	J	1.0	YES	S3VEM
Arsenic	Target	8.2		mg/kg	8.2		1.0	YES	S3VEM
Barium	Target	121		mg/kg	121		1.0	YES	S3VEM
Beryllium	Target	0.45		mg/kg	0.45		1.0	YES	S3VEM
Cadmium	Target	1.6		mg/kg	1.6		1.0	YES	S3VEM
Calcium	Target	17800		mg/kg	17800		1.0	YES	S3VEM
Chromium	Target	46.3		mg/kg	46.3		1.0	YES	S3VEM
Cobalt	Target	25.0		mg/kg	25.0		1.0	YES	S3VEM
Copper	Target	85.0		mg/kg	85.0		1.0	YES	S3VEM
Iron	Target	18600		mg/kg	18600		1.0	YES	S3VEM
Lead	Target	613		mg/kg	613		1.0	YES	S3VEM
Magnesium	Target	2430		mg/kg	2430		1.0	YES	S3VEM
Manganese	Target	289		mg/kg	289		1.0	YES	S3VEM
Nickel	Target	23.7		mg/kg	23.7		1.0	YES	S3VEM
Potassium	Target	562		mg/kg	562		1.0	YES	S3VEM
Selenium	Target	3.0	U	mg/kg	3.0	U*	1.0	YES	S3VEM
Silver	Target	0.87	U	mg/kg	0.31	J*	1.0	YES	S3VEM
Sodium	Target	723		mg/kg	723		1.0	YES	S3VEM
Thallium	Target	0.80	J	mg/kg	0.80	J	1.0	YES	S3VEM
Vanadium	Target	26.7		mg/kg	26.7		1.0	YES	S3VEM
Zinc	Target	231		mg/kg	231		1.0	YES	S3VEM

# Sample Summary Report

Project Name: PIERSON'S CREEK Project

GroupID: 47747/EPW14030/MBE7Z4

Lab Name: Chemtech Consulting Group

Sample Number: PBS606	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location:	pH:	Sample Date:	Sample Time:
% Moisture:		% Solids: 100	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Aluminum	Target	20.0	U	mg/kg	20.0	U	1.0	YES	S3VEM
Antimony	Target	6.0	U	mg/kg	6.0	U	1.0	YES	S3VEM
Arsenic	Target	1.0	U	mg/kg	1.0	U	1.0	YES	S3VEM
Barium	Target	20.0	U	mg/kg	20.0	U	1.0	YES	S3VEM
Beryllium	Target	0.50	U	mg/kg	0.50	U	1.0	YES	S3VEM
Cadmium	Target	0.50	U	mg/kg	0.50	U	1.0	YES	S3VEM
Calcium	Target	500	U	mg/kg	500	U	1.0	YES	S3VEM
Chromium	Target	1.0	U	mg/kg	1.0	U	1.0	YES	S3VEM
Cobalt	Target	5.0	U	mg/kg	5.0	U	1.0	YES	S3VEM
Copper	Target	2.5	U	mg/kg	2.5	U	1.0	YES	S3VEM
Iron	Target	10.0	U	mg/kg	10.0	U	1.0	YES	S3VEM
Lead	Target	1.0	U	mg/kg	1.0	U	1.0	YES	S3VEM
Magnesium	Target	500	U	mg/kg	500	U	1.0	YES	S3VEM
Manganese	Target	1.5	U	mg/kg	1.5	U	1.0	YES	S3VEM
Nickel	Target	4.0	U	mg/kg	4.0	U	1.0	YES	S3VEM
Potassium	Target	49.3	J	mg/kg	49.3	J	1.0	YES	S3VEM
Selenium	Target	3.5	U	mg/kg	3.5	U	1.0	YES	S3VEM
Silver	Target	1.0	U	mg/kg	1.0	U	1.0	YES	S3VEM
Sodium	Target	86.8	J	mg/kg	86.8	J	1.0	YES	S3VEM
Thallium	Target	2.5	U	mg/kg	2.5	U	1.0	YES	S3VEM
Vanadium	Target	5.0	U	mg/kg	5.0	U	1.0	YES	S3VEM
Zinc	Target	1.3	J	mg/kg	1.3	J	1.0	YES	S3VEM

# Sample Summary Report

Project Name: PIERSON'S CREEK Project

GroupID: 47747/EPW14030/MBE7Z4

Lab Name: Chemtech Consulting Group

Sample Number: PBS827

Method: Mercury by Cold Vapor

Matrix: Soil

MA Number: 2755.2

Sample Location:

pH:

Sample Date:

Sample Time:

% Moisture:

% Solids: 100

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.050	U	mg/kg	0.050	U	1.0	YES	S3VEM

# Sample Summary Report

Project Name: PIERSON'S CREEK Project

GroupID: 47747/EPW14030/MBE7Z4

Lab Name: Chemtech Consulting Group